

# CHAPTER 37

## Percussion of the Heart

### KEY TEACHING POINTS

- Although the clinical value of cardiac percussion is limited, the finding of cardiac dullness extending less than 10.5 cm from the midsternal line greatly decreases the probability of an enlarged heart on chest x-ray.

### I. INTRODUCTION

Percussion of the heart has its roots in the 1820s, when a student of Laennec, Pierre Piorry, enthusiastically introduced topographic percussion, a technique purportedly allowing clinicians to precisely outline the borders of the underlying organs, including those of the heart.<sup>1-3</sup> Although many of Piorry's claims seem extraordinary nowadays (e.g., he declared that he could outline pulmonary cavities, the spleen, hydatid cysts, and even individual heart chambers), many of his innovations persist, including indirect percussion, the pleximeter (Piorry used an ivory plate, but most clinicians now use the left middle finger), and the current practice of using percussion to locate the border of the diaphragm on the posterior chest or the span of the liver on the anterior body wall.<sup>4</sup>

In 1899, only 4 years after the discovery of roentgen rays, Williams challenged the accuracy of cardiac percussion, showing that many patients with moderately large hearts (autopsy weight of 350 to 500 grams) had normal findings during cardiac percussion.<sup>5</sup> Cardiac percussion suffered another setback in 1907, when Moritz published the composite outlines of cardiac dullness according to various authorities, showing that these authorities not only disagreed with each other but also with the true roentgenographic outline.<sup>4,6</sup> By the 1930s many leading clinicians began to regard percussion of the heart as unreliable and often inaccurate.<sup>4,7</sup>

### II. CLINICAL SIGNIFICANCE

Studies of cardiac percussion have several limitations, the most important of which is selectively enrolling only healthy patients lacking chest deformities or emphysema. Nonetheless, even these studies show that the percussed outline of the heart correlates only moderately with the true cardiac border. Whether the patient is supine or upright, the average error in locating the cardiac border is 1 to 2 cm (the standard deviation of this error is approximately 1 cm). The clinician usually overestimates the left border by placing it too far laterally and underestimates the right border by placing it too near the sternum (these errors tend to cancel each other if the study's endpoint is total transverse diameter of the heart).<sup>8-11</sup> In patients with emphysema the errors are even greater.<sup>12</sup>

The traditional sign of an enlarged heart by percussion is cardiac dullness that extends too far laterally. The findings of either cardiac dullness extending beyond the midclavicular line or more than 10.5 cm from the midsternal line modestly



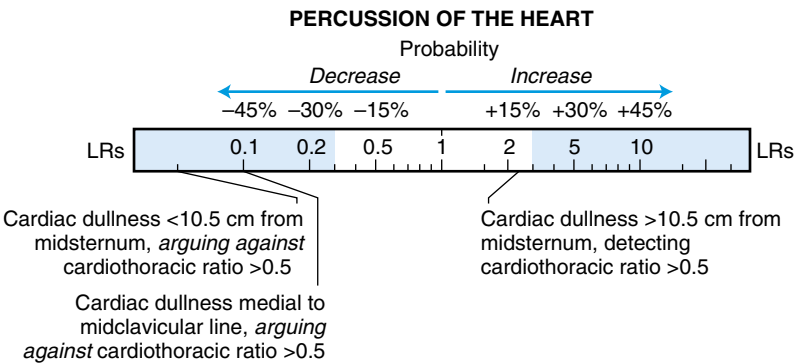
**EBM BOX 37.1**  
*Percussion of the Heart\**

Finding (Reference)	Sensitivity (%)	Specificity (%)	Likelihood Ratio <sup>†</sup> if Finding Is	
			Present	Absent
<i>Dullness Extends More Than 10.5 cm From Midsternal Line, Patient Supine</i>				
Detecting cardiothoracic ratio >0.5 <sup>13</sup>	97	61	2.5	0.05
Detecting increased left ventricular end-diastolic volume <sup>14</sup>	94	32	1.4	NS
<i>Dullness Extends Beyond Midclavicular Line, Patient Upright</i>				
Detecting cardiothoracic ratio >0.5 <sup>8</sup>	97	60	2.4	0.1

\*Diagnostic standard: For *cardiothoracic ratio*, maximal transverse diameter of heart on chest radiography divided by maximal transverse diameter of thoracic cage; for *increased left ventricular end-diastolic volume*, > 186 mL by ultrafast computed tomography.<sup>14</sup>

<sup>†</sup>Likelihood ratio (LR) if finding present = positive LR; LR if finding absent = negative LR.  
NS, Not significant.

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increase the probability of an enlarged cardiothoracic ratio (likelihood ratio [LR] = 2.4 to 2.5; [EBM Box 37.1](#)). If cardiac dullness does *not* extend beyond these points, the patient probably does *not* have an enlarged cardiothoracic ratio (LRs = 0.05 to 0.1; see [EBM Box 37.1](#)). Nonetheless, it is unlikely that this information is clinically useful because the cardiothoracic ratio has uncertain clinical significance.

The references for this chapter can be found on [www.expertconsult.com](http://www.expertconsult.com).

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